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PATHFINDER

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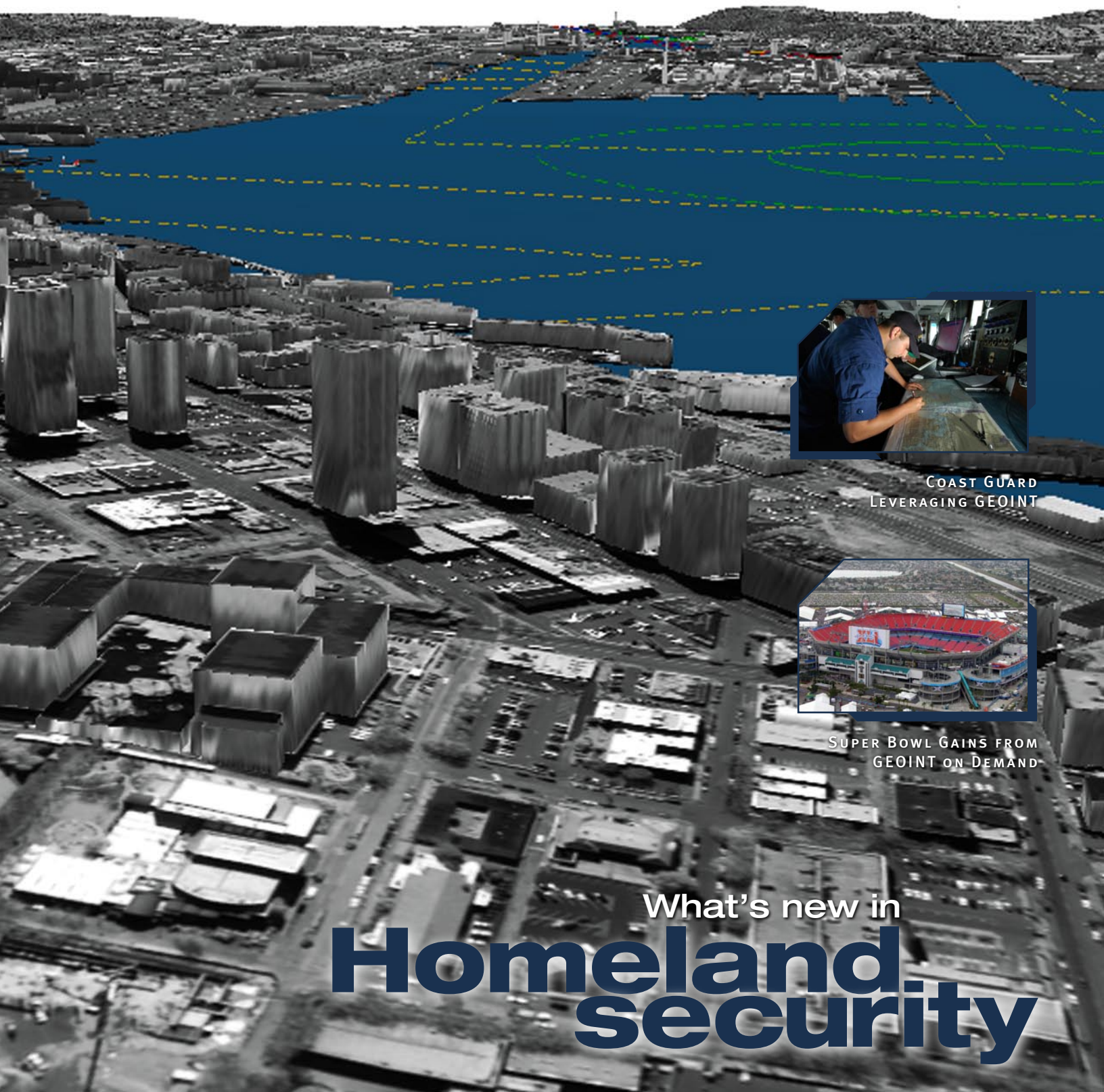


COAST GUARD LEVERAGING GEOINT

SUPER BOWL GAINS FROM GEOINT ON DEMAND

What's new in

Homeland security

On My Mind

NGA Provides Key Support to Homeland Security

NGA support to homeland security and homeland defense has been and will remain a key component of the overall NGA mission. Hurricane Andrew, the Defense Against Weapons of Mass Destruction Act of 1996, the Sept. 11, 2001 terrorist attacks and Hurricane Katrina are key events that have shaped NGA's support to the domestic mission set.

Today we remain a nation at risk. Geographic distance no longer provides a buffer from danger and threats facing our nation. It is a tall order to ensure that our citizens are safe from acts of violence and terrorism, our cities are prepared for natural disasters, and our nation's events are guarded from potential security threats.

NGA will continue to insert geospatial intelligence (GEOINT) as the key situational-awareness enabler for all our domestic partners. NGA strategies, in alignment with the U.S. national-security strategy and national-response plan, will continue to focus on integrating GEOINT capabilities with our domestic and international partners in order to ensure that they are directly connected to our homeland-security efforts.

NGA Initiatives

Consistent with NGA's ongoing collaboration initiatives, NGA's Office of the Americas/North America and Homeland Division (PMH) has instituted the Homeland Security Infrastructure Program (HSIP) to use GEOINT from numerous sources within the United States, including local governments, to establish a "gold" database of vector, imagery and elevation data. Additionally, PMH has made excellent progress with the Cross Border Infrastructure Program (CBIP). CBIP is a joint U.S. and Canada data-sharing effort that ensures consistent and accurate monitoring on both sides of the U.S.–Canadian border.

Building and Enhancing Partnerships

NGA's partnerships with government and international entities and relationships with industry are the cornerstone of mission success. We will continue to build on and enhance our partnerships to ensure we break down barriers that may potentially hinder our national-security efforts. We are asserting our leadership to establish data and system standards to ensure interoperability between all partners. Our NGA Support Teams (NSTs) are gaining firsthand understanding of our mission partners' most significant problems and do an extraordinary job providing GEOINT contributions to solving these problems. As we look outward to become the most collaborative partner, our domestically assigned NSTs, located at the FBI, Department of Homeland Security (DHS) and NORTHCOM, will continue to provide real-time GEOINT support that will enable our partners and decision-makers to achieve their national-security goals. The locational and visualization expertise we provide is rapidly absorbed in the mission set of these partners.

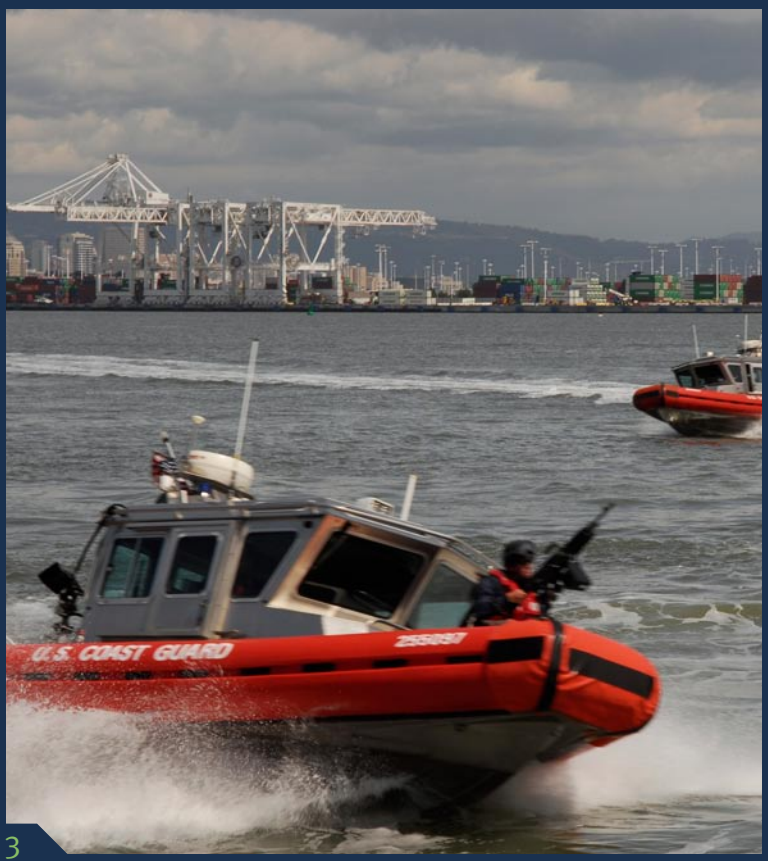
Homeland Security Successes

The events of Sept. 11, 2001 led NGA to become increasingly involved in large-scale homeland security and defense efforts. Over the past year, NGA analysts and deployable teams have contributed to numerous successes, always in support of a lead federal agency. For example, NGA analysts worked with our commonwealth and domestic partners to make significant GEOINT contributions to security preparedness for the 2007 Super Bowl. Also, NGA analysts have aggressively assimilated geospatial data in support of the DHS southwest border security initiative and have recently released Version 2 of the Homeland Security Infrastructure Program Gold dataset.

Looking Ahead

Looking toward the future, NGA will continue to leverage new and existing technologies, such as the Geospatial Intelligence Operations Support and the Battlefield, NGA Earth and eGEOINT initiatives to enhance data collection and dissemination to our warfighters, first responders and analysts in the field. In addition, the National System for Geospatial Intelligence will work to best leverage commercial products to advance the actionable and predictive value of GEOINT to key decision makers. As our adversaries continue to make attempts to penetrate our land, air and maritime borders, NGA will work in conjunction with our mission partners to enhance U.S. homeland-security and defense capabilities.

Robert B. Murrett
Vice Admiral, USN
Director



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On the Cover

A scene from NGA's HarborView, an interactive navigational aid, shows the port of Seattle with navigational areas marked. A three-dimensional scene-visualization product, viewed through Harris Corporation's InReality software, HarborView is used to familiarize operators with ports prior to actually sailing there. It includes a virtual compass and information on heading and speed. A related database describes the graphical features. NGA continues its innovative approach to homeland security with new and enhanced products and services, both on site and online. In this issue, the Pathfinder highlights a few of these innovations while spotlighting a valued partner in homeland defense, the U.S. Coast Guard. Graphic courtesy of Analytical Graphics Inc.

Letter to Our Readers

What's New in Homeland Security

NGA's newest mission—homeland security—continues its rapid evolution, in response to changes in technology and the threats Americans face. In spotlighting some of the fast-moving developments in this area, we chose the theme "What's New in Homeland Security" for this issue.

We also spotlight one of our most important partners—the U.S. Coast Guard—with a guest column from the Commandant, Adm. Thad Allen. The past five years have seen significantly increased collaboration over a range of issues, he notes, from enhancing navigation safety with tools like HarborView to improving maritime domain awareness with all-source intelligence. Captain Michael Alfultis, Head of the Science Department at the Coast Guard Academy, follows in a discussion of the need to develop spatial literacy in future Coast Guard officers.

For innovations, we lead off with an article about "HSIP Gold"—the most versatile application of NGA's Homeland Security Infrastructure Program. NGA has just issued a new version on two DVDs that contains more data and new management tools, making it significantly more robust than its predecessor.

Less tangible, but no less real, is the developing role NGA plays in special security events like the Super Bowl. After reading Randy Hamilton's article, "Super Bowl Gains from GEOINT on Demand," it will be clear that the situational awareness NGA provides at events like this is a huge asset our nation can no longer afford to be without.

Meanwhile, NGA's deployable systems have become a family, ranging in size from a facility that moves on the chassis of a fire truck to a lunch-box-sized container that can be carried aboard an aircraft. Al Trujillo introduces the family in "New Deployables: Taking Shape and Already Working."

Three-dimensional models of terrain, equipment and facilities have also evolved. Computer-guided milling and printing, fed by NGA's geospatial source data, are providing models of unprecedented realism and detail, writes Rodney Vanderpol in "3-D Modeling Adds a Dimension to Mapping." As a result, the number of applications and customers continues to grow.

For a change of scenery, far removed from the homeland, be sure to read "Safety of Antarctic Endeavors Depends on NGA" by Julia Collins. What NGA can bring to operations is all the more dramatic in that harsh climate.

The September-October Pathfinder will discuss NGA's progress in each of the 12 Focus Areas senior leaders identified toward the end of last year. We will also look back on 10 years of GEOINT, as NGA completes the yearlong celebration of the 10th year since its establishment by Congress.

Paul R. Weise
Director, Office of Corporate Relations

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GETTING PUBLISHED
All members of the geospatial intelligence community are welcome to submit articles of community-wide interest. Articles are edited for style, content and length. The copy deadline is the last Friday of the third month before publication. For details on submitting articles, send an e-mail to pathfinder@nga.mil.

Guest Column

Coast Guard Leveraging GEOINT to Support Diverse Mission

By Adm. Thad Allen, Commandant, U. S. Coast Guard

Today our nation faces threats unlike any we have experienced before. Aside from the constant challenge of protecting the homeland from those who desire to do us harm, we must concern ourselves with piracy, illegal immigration and smuggling, terrorism, arms proliferation, natural disasters and environmental crimes. With 95 percent of the U.S. international commerce moving through our ports, our nation's economic health is also dependent on ensuring our coasts, ports and inland waterways are secure. As the principal federal agency charged with maritime safety, security and stewardship of U.S. waters and coastlines, the U.S. Coast Guard (USCG) is always ready to protect and respond.

Over the past five years, collaboration between NGA and USCG has increased considerably. We are working side by side to best identify ways to leverage NGA's support to the diverse mission areas of the Coast Guard. Through the NGA Support Team assigned to the Department of Homeland Security (DHS) and direct support to Coast Guard units, NGA's geospatial intelligence (GEOINT) products are providing commanders, planners and operators with the situational awareness needed prior to and during operations. Several recent examples demonstrate this successful partnership.

Take, for example, NGA's recent partnership with Coast Guard Search and Rescue to successfully locate an overdue vessel. As a result of this mission success, the two agencies now realize that NGA has much to contribute to search and rescue operations. I foresee these efforts expanding to other mission areas of the Coast Guard where access to intelligence information in a timely manner is critical to mission success.

NGA has also provided a number of GEOINT products that have given operational advantage to the Coast Guard. Two NGA-specific products that provide invaluable situational awareness, Geospatial Intelligence for Operations Support and the Battlefield (GIB) and HarborView, have become an integral part of the deployment package supporting the Maritime Safety Response Teams. With the GIB, a mobile visualization tool provided on DVD, users have the capability to define the area of operations and

Admiral Thad Allen, Commandant of the U.S. Coast Guard, climbs the foremast of the Coast Guard Cutter Barque Eagle during a cruise along the Potomac River. The Coast Guard is partnering with NGA and other members of the Intelligence Community to ensure information and analytical capabilities are best leveraged to improve maritime domain awareness.

visualize intelligence information in a geospatially precise manner. HarborView is a three-dimensional scene-visualization model used to familiarize operators with ports prior to actually sailing there. Not only does it provide for safety of navigation, it also enables operational training, mission planning and mission rehearsal.

Improving maritime domain awareness (MDA) is one of the Coast Guard's strategic priorities. All-source intelligence capabilities, combined with traditional sources and methods, provide unprecedented MDA about vessels, people, cargo, weather, environment and infrastructure. The Coast Guard Intelligence Program is partnering with NGA and other members of the Intelligence Community to ensure information and analytical capabilities are best leveraged to improve MDA. DHS and the Department of Defense are co-leading the MDA Implementation Team, which is working to develop a more collaborative intelligence- and information-sharing environment, including both systems and processes, for sensing, collecting,

U.S. Coast Guard photo by Public Affairs Specialist 3rd Class Jonathan R. Cilley

A Coast Guard Maritime Safety and Security team, from Coast Guard Island in Alameda, Calif., demonstrates boat tactics in San Francisco Bay.

fusing, analyzing and disseminating information. NGA has the lead to provide the geospatial foundation, or common operational picture, for this effort.

NGA's support to the Coast Guard during and after Hurricane Katrina cannot be overstated. NGA deployed numerous analysts and two Mobile Integrated Geospatial Intelligence Systems to provide on-the-ground support. Additionally, on behalf of the Coast Guard, NGA's World Wide Navigational Warning Service radio desk transmitted navigation safety messages to the U.S. Navy and U.S. Merchant Marine about port closures and waterway conditions in the New Orleans area while we repaired systems damaged by the hurricane.

Our NGA-USCG partnership is important, not just in responding to natural disasters, but also in preparing for natural disasters. This year, in support of the Environmental Protection Agency and USCG co-sponsored "Spill of National Significance 2007 Exercise" (SONS 07), NGA will forward-deploy the Domestic Mobile Integrated Geospatial Intelligence System. SONS 07, the first exercise to use a national disaster as a major incident, will focus on issues pertaining to catastrophic oil and hazardous substance releases within the Ohio River Valleys, triggered by a major earthquake along the New Madrid, Mo., fault and a tornado in the Great Lakes region.

These examples are just a sample of the numerous success stories demonstrating the synergy of the NGA-Coast Guard relationship. As we continue to safeguard America against the threats and hazards of today and tomorrow, partnerships with agencies like NGA are vital to continued success. I look forward to our ongoing collaboration as we work together to help keep America safe, secure and prepared. P

A Coast Guard helicopter passes over Washington, D.C., during an air defense training mission. The Coast Guard has been tasked with intercepting low-flying, slow speed aircraft in restricted air space over Washington, D.C.

U.S. Coast Guard photo by Public Affairs Specialist 1st Class John Edwards

NGA Supports Coast Guard in Developing Spatial Literacy

By Capt. Michael Alfultis

Watch-standers and command cadre in the U.S. Coast Guard have long had to concern themselves with acquiring, displaying and analyzing geospatial information for decision-making. Geospatial information is required for safely navigating a vessel, locating vessels in distress, managing vessel traffic in or out of major ports and responding to casualty and marine pollution incidents.

In recent years, an increased emphasis on maritime domain awareness, combined with new technologies, has greatly increased the importance of developing "spatial literacy" in Coast Guard officers. Spatial literacy—proficiency in using spatial knowledge and skills—has become vital to mission accomplishment.

NGA is contributing to efforts by the U.S. Coast Guard Academy to develop the spatial literacy of the Coast Guard's future officers.

Importance of Spatial Literacy

Geospatial technologies have become increasingly important on all levels—from the national strategic level to the Coast Guard strategic level down to unit operational and tactical levels. At the national level, geospatial technologies support all six of the critical mission areas of National Homeland Security Strategy:

- intelligence and warning
- border and transportation security
- domestic counterterrorism
- protecting critical infrastructures
- defending against catastrophic threats
- emergency preparedness and response.

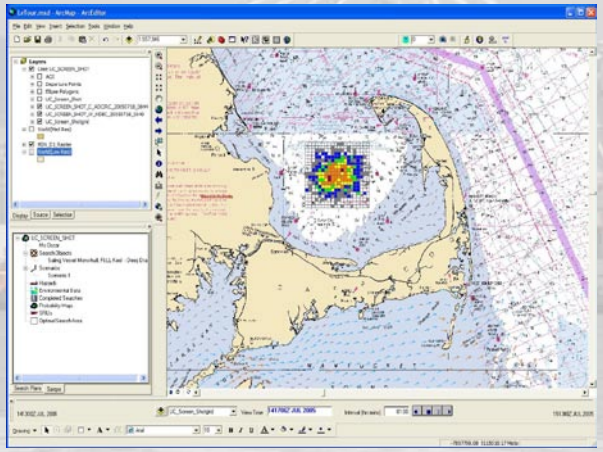
At the same time, the Coast Guard is building a process and infrastructure for maritime domain awareness that will be vital to the fulfillment of the Coast Guard's homeland-security responsibilities. Achieving maritime domain awareness requires:

- collecting maritime data, information and intelligence
- collating, correlating, analyzing and interpreting the collected material
- providing effective assessment, actionable intelligence and relevant knowledge
- disseminating intelligence to appropriate federal, state, local, private and international stakeholders.

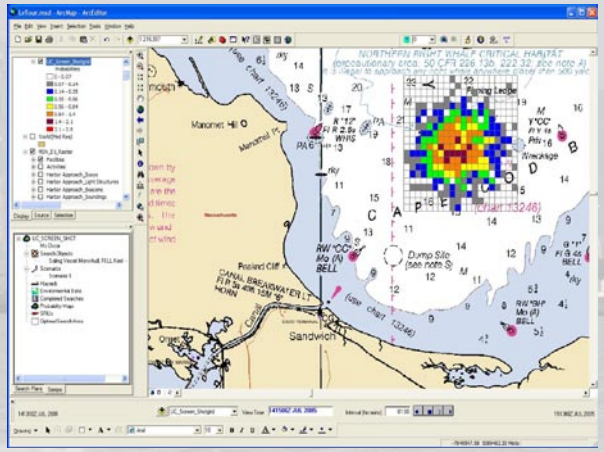
At the unit operational and tactical level, geospatial technologies have proven critical to maintaining situational awareness and effective communications before, during and after national security events and federal disaster response and recovery actions.

Many current and planned operational, intelligence and business-information systems are based on geospatial technologies:

- Coast Guard Common Operational Picture, which uses an interactive digital map to share information across computer networks in command centers and mobile assets.
- Maritime Awareness Global Network, which allows users to analyze and display vessel data and other strategic and tactical intelligence spatially.
- Hawkeye system, which leverages multiple remote-sensing systems to improve situational awareness within a Coast Guard Sector Command Center's area of responsibility. Hawkeye includes a geographic information system to spatially display the data and manage the sensors.
- Coast Guard Search and Rescue Optimal Planning System (SAROPS), which incorporates NGA's Commercial Joint Mapping Toolkit to provide a common viewer with a known interface for search and rescue operations. SAROPS uses environmental information like wind direction to determine a search target's probable location, displays search patterns and provides tools for search-and-rescue case management.
- Marine Information for Safety and Law Enforcement system, which provides a repository for a variety of operational activities, along with a viewer for displaying and analyzing the information geographically.
- Capital Asset Management Portal, which provides access through a single portal to information pulled from multiple enterprise-level applications. For any given level of the Coast Guard's organizational structure, an interactive map window displays the unit data spatially alongside a listing of the assets and their value.



Cape Cod Bay is the area of interest for an application of the Coast Guard Search and Rescue Optimal Planning System (SAROPS), as viewed through NGA's Joint Mapping Toolkit.



SAROPS uses environmental information like wind direction to determine a search target's probable location.

» Coast Guard Business Intelligence (CGBI), which allows users to access and interact with several enterprise data systems and analyze the information in a geospatial display. For example, CGBI provides readiness data geospatially for every Coast Guard unit.

The use of geospatial and remote-sensing technologies will increase substantially as the Integrated Deepwater System becomes operational. The Coast Guard's integrated modernization program, Deepwater is designed to provide more capable assets for better surveillance, secure communications and more efficient command and control in surface and airborne assets. In line with the Coast Guard's strategic approach to maritime homeland security, Deepwater places a premium on identifying and intercepting threats well before they reach U.S. shores. Plans call for nearly every surface and airborne Deepwater asset to carry a complete suite of visual, infrared and radar sensors that will provide Coast Guard crews with multiple opportunities to prosecute potential threats across the entire maritime domain.

Geospatial technologies are increasingly important at all levels and with numerous partners at the local, state and federal level, who use them for situational awareness and communication during every phase of an emergency. As a result, Coast Guard officers need to be increasingly literate in using spatial knowledge and skills to fulfill the Coast Guard's mission requirements for homeland security, maritime domain awareness, and command, control and intelligence.

Initiatives to Develop Spatial Literacy

To meet the increasing need for spatially literate officers, the Coast Guard Academy Science Department began offering an Introduction to Geospatial Sciences course to seniors in its Marine and Environmental Sciences (MES) major in the spring of 2003. Since then, approximately 30 students a year have taken this course, which is now offered to juniors. Offering the course a year earlier provides students an opportunity to apply their spatial knowledge and skills in other courses, independent research and internships. The department is examining courses in the sophomore year for opportunities to begin the development of spatial literacy. Plans are also now in place for the creation of an advanced geospatial sciences course for seniors who have taken the introductory geospatial sciences course and are looking to further develop their spatial thinking, knowledge and skills.

When the changes are complete, spatial literacy will be fully incorporated across the MES curriculum. The overall goal of these efforts is not to develop technicians fully proficient in the use of geographic information systems. Rather, the aim is to develop *spatially literate* Coast Guard decision-makers with knowledge and skills in the use of geospatial technologies for emergency planning and response, facilities management and operational resource management and decision-making.

NGA's Contributions to Training Efforts

An avid supporter of the Coast Guard's efforts to develop spatial literacy, NGA has provided funds to purchase

hardware and software, off-site and on-site training and travel to conferences through its Service Academy Grant Program.

The Office of the Americas and Office of Global Navigation have also provided software, data and guest speakers. Through these efforts, students at the U.S. Coast Guard Academy are exposed to several important NGA programs that support homeland security, such as the Homeland Security Infrastructure Program, Web-based Palanterra™ software package for situational awareness and three-dimensional HarborView visualization tool and data.

NGA's support has significantly enhanced the quality and impact of the Coast Guard Academy's geospatial-science education program.

Future Efforts

Although 30 spatially literate MES students now graduate from the U.S. Coast Guard Academy each year, the rapid incorporation of geospatial technologies into information-technology systems across multiple Coast Guard mission areas requires the development of spatially literate students outside the MES major. To meet this need, the Science Department has established a geographic information system for the use of every faculty member and student at the academy. Training was provided in the fall of 2006 to expose faculty in every academic department to the potential use of geographic information systems in their particular area of interest. As a result of this training, geospatial activities have increased in the Civil Engineering, Mathematics and Humanities Departments at the academy.

Additional future efforts and activities will include:

- incorporation of several activities based on the geographic information system into the oceanography course taken by every student not in the MES major
- expansion of course offerings, student research and internship opportunities
- creation of an interdepartmental geospatial science education working group
- expansion of spatial literacy development across the entire academic program
- establishment of geographic information system World Wide Web services

Once these efforts and activities are in place, the U.S. Coast Guard Academy will have an effective system in place to develop the spatial literacy of all its graduates, thus meeting the Coast Guard's need for officers proficient in spatial knowledge, thinking and skills.

Multi-Layered Approach to Training Needed

Because geospatial technologies are embedded across nearly all U.S. Coast Guard operational and business systems, it is doubtful that a single approach to geospatial education and training will be successful or meet all Coast Guard mission needs. Geospatial education and training will, therefore, need to be delivered through multiple means:

- formal geospatial education as part of the U.S. Coast Guard Academy undergraduate program
- pipeline training on geographic information systems for officers and senior enlisted serving as senior watch-standers, supervisors and program managers
- traveling road shows to provide training on geographic information systems and support on site
- mission-specific geospatial training in several Coast Guard schools
- user guides and online help for individual systems
- on-the-job training and mentorship of a local expert in geospatial technologies
- geospatial training tied to the Coast Guard Incident Command System curriculum

Given the rapid rise in the use and importance of geospatial technologies for effective mission accomplishment across all Coast Guard mission areas, establishing such a multi-layered approach to geospatial education and training must become an organizational priority. P

Coast Guard Capt. Michael Alfultis

is Head of the Science Department at the Coast Guard Academy and a member of the academy's permanent commissioned teaching staff. He earned his Ph.D. in oceanography from the University of Rhode Island. Besides operational assignments in the Coast Guard, he served with the International Ice Patrol.

New 'HSIP Gold' Offers More Data, Dramatic Improvements

By the Domestic Preparedness Branch

The federal homeland security community is getting more and better infrastructure information, thanks to a new release on two DVDs by NGA's North America and Homeland Security Division (PMH). Version 2 of the Homeland Security Infrastructure Program (HSIP) Gold dataset provides an updated, improved common store of vector data on domestic critical infrastructure that agencies can use in developing and exercising response plans to acts of terrorism, natural disasters and other homeland-security events. (Vector data is computer-based graphical information portrayed as points, lines and polygons.)

Since the program's inception in 2002, the vector content of HSIP has grown steadily larger and more heterogeneous. NGA initially purchased most of the HSIP data from commercial vendors. Over time, NGA analysts have collected additional data through interactions with state and local agencies during disaster responses and special-security events.

The Homeland Infrastructure Foundation-Level Data Working Group, representing government and private members of the homeland security community, sponsored a meeting to gather feedback after NGA released the first version of HSIP Gold two years ago. Users conferred on the content and structure of the data and recommended alternate sources for many of the datasets.

Version 2 of HSIP Gold includes many of these new datasets, collected since last November by the working group and NGA's Domestic Preparedness Branch in PMH. From federal and military organizations, the datasets were, in large part, recommended during the working group's feedback session.

Some of these new datasets provide more complete, more current, or more richly attributed data than the data that was already included in HSIP Gold. Many, however, represent completely new data that enable the federal homeland security community to perform a wider range of analyses in preparation for disasters and special-security events. Finding the nearest hospital, conducting line-of-sight analyses, matching street addresses to locations and many other applications are significantly enhanced with the new datasets.

In addition to a nearly one-third increase in datasets, HSIP Gold version 2 has three qualitative improvements:

- Standard fonts for symbology established by the Federal Geographic Data Committee (FGDC) Homeland Security Working Group. The FGDC symbols appear the same regardless of the software application used. However, users can turn off the FGDC symbology and use more familiar icons if they prefer.

The Homeland Security Infrastructure Program (HSIP) comprises NGA holdings of imagery, Light Detection and Ranging (LIDAR) data and vector data over the U.S. homeland. Imagery holdings include nationwide 1-meter and high-resolution (1-foot or better) urban area commercial airborne imagery. The LIDAR data provides three-dimensional elevation data for selected urban areas identified by the Department of Homeland Security (DHS). Vector data includes nationwide datasets, such as the nation's energy system and transportation networks, and high-density local data.

HSIP Gold contains a subset of the HSIP vector data holdings that is released to the federal community for official use in the homeland security mission. State and local users may view the data on a DHS Web-based geographic information system based on Palanterra™, NGA's homeland-security software package.

The Homeland Infrastructure Foundation-Level Data Working Group is a coalition of federal, state and local government organizations, federally funded research and development centers, and supporting private industry partners who are involved with geospatial issues related to homeland security, homeland defense, civil support and emergency preparedness and response. The working group is co-sponsored by the Office of the Assistant Secretary of Defense for Homeland Defense and Americas' Security Affairs, NGA and the DHS Directorate of Preparedness. See www.hifldwg.org for more information.

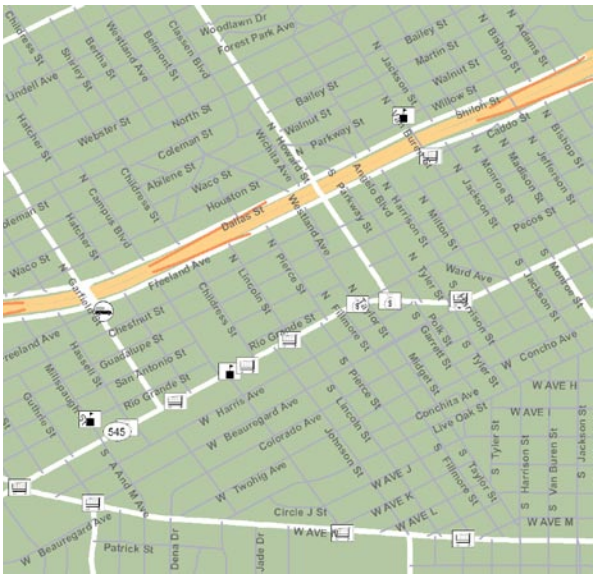
- FGDC-compliant metadata (information about the datasets, such as accuracy, date collected, etc.).
- A greater percentage of accurately geolocated data points. NGA used TechniGraphics Incorporated's proprietary PinPointer® process to improve the positional accuracy of critical datasets. Through PinPointer®, TechniGraphics precisely locates facilities while verifying other attributes.

More to Come

Recognizing the need for a common homeland security vector database across all levels of government, NGA, FGDC and TechniGraphics are working together to instantiate a new initiative called HSIP Freedom. Through contacts made at the National States Geographic Information Council and by leveraging state-level coordinators from the Department of Homeland Security and the U.S. Geological Survey, NGA will obtain license-free, state-owned data. This collection will focus at first on datasets that are restricted to federal use only; however, the eventual goal is to provide a highly accurate, minimally restricted set of infrastructure data that federal, state, local and nongovernmental agencies can use for planning, exercises and operations.

The current HSIP Gold delivers numerous databases "as is," with no single data model. Consequently, users must often query HSIP Gold multiple times to access the data they need. NGA has contracted with Applied Geographics to develop a data dictionary that will help analysts in the Domestic Preparedness Branch to harmonize the minimum essential data within the disparate HSIP Gold data models. Once this harmonization is complete, most users will require only a single query to access data from the entire HSIP Gold database. This will also simplify the effort required to extract, transform and load HSIP Gold into a standard data model, whether that is the National System for Geospatial Intelligence standard or the DHS Geospatial Data Model. The data dictionary will also generate a schema for the homeland security community to use in collecting data for future iterations of HSIP Gold.

HSIP Gold has a promising future. NGA will continue to work with its government and contract partners to acquire and improve data and make it available to homeland security mission partners at all levels of government.



The Homeland Security Infrastructure Program includes vector data over the U.S. homeland like the sample above, Light Detection and Ranging (LIDAR) data, which provides high-resolution three-dimensional perspectives, and commercial airborne imagery.

Using GEOINT to Protect Our Homeland

Since its creation after the attacks of Sept. 11, 2001, NGA's North America and Homeland Security Division has become the developer, broker and integrator of geospatial intelligence (GEOINT) to protect our homeland. At the same time, NGA gives customers Web access and experts to assist with analysis—on site and online.

Support NGA provided in response to Hurricanes Katrina and Rita was viewed by many customers as setting the standard for the future. It included identifying key infrastructure, locating citizens in need, conducting damage assessments, monitoring levee stability, issuing navigational advisories and many other actions. NGA was on the ground at every key customer location providing critical information to first responders, national agencies and the Department of Defense.

NGA continues efforts with its mission partners to identify and apply advanced GEOINT tradecraft to support special-security events and to ensure that those advances are available for readiness, response and recovery efforts in cases of natural or manmade disasters.

Super Bowl Gains from GEOINT on Demand

By Randall Hamilton

A steady rain fell on Dolphin Stadium, but over 74,000 people still turned out to see the 29-17 victory of the Indianapolis Colts over the Chicago Bears at Super Bowl XLI on Feb. 4. Riveted to the game, the fans no doubt were oblivious to the security efforts that surrounded them. These were made possible by a high degree of situational awareness, thanks to the collaboration of NGA and the FBI, Broward County Sheriff's Office, Miami-Dade Police Department and nearly 40 additional federal, state and local agencies.

The Domestic Preparedness Branch in the Office of America's North America and Homeland Security Division and the FBI NGA Support Team led NGA's support to FBI security operations. Critical systems and communications were supplied by the Office of Global Support, and NGA's Security Office also supported the event. Other NGA offices provided support that ranged from management to legal guidance.

Arriving in Miami at least 10 days before the Super Bowl were teams from the Domestic Preparedness Branch, which helped the FBI's Miami Field Office set up joint intelligence and operations centers, and the Office of Global Support, which helped configure communications.

Common Operational Picture

The Global Support team redirected the display of a remote laptop to one of four large screens in the joint operations center, providing access in real time to a common operational picture using NGA's Palanterra™ Web-centric architecture. With Palanterra™, the NGA team integrated information from various incident-reporting systems and provided tailored geospatial intelligence (GEOINT). The visualization of activities allowed all agency representatives in the operations center to understand events and threats from a spatially analyzed point of view.

NGA's Domestic Mobile Integrated Geospatial Intelligence System (DMIGS) also arrived early to establish communications and data connections with the joint intelligence and operations centers. The DMIGS then moved alongside the FBI's mobile command center, where it integrated GEOINT support with the tactical team's operations.

GEOINT on Demand

Although no major incidents occurred at or near the Super Bowl, the NGA and FBI teams did respond to occasional minor events. For example, the Joint Operations Center received reports of a vehicular explosion, causing concern over whether the incident had taken place close to the players' hotels, Dolphin Stadium or routes in between. A quick analysis showed that the mishap had occurred at some distance from any official National Football League venue.

On another occasion, the center learned of suspicious queries regarding flight restrictions. The NGA team was able to quickly identify and locate the source of the queries and its location relative to restricted air space and Super Bowl activities.

In still another incident, individuals were observed on the perimeter of security-team assets and equipment, using binoculars and apparently taking notes. The NGA team promptly assisted the FBI with a line-of-sight analysis showing precisely what the individuals could have observed from their locations.

Mission Accomplished

The weather conditions on game day resulted in the first Super Bowl to be played in the rain, but it also had the effect of greatly reducing the number of incidents. During the course of the operations, the NGA team hosted a number of senior leaders from NGA, federal officials and state and local authorities. Observers also included Canada's Department of National Defence and Royal Canadian Mounted Police, while an analyst from Australia's Defence Imagery and Geospatial Organisation was fully integrated into the NGA team.

The combined efforts of NGA, the FBI, other federal agencies and state and local law-enforcement made this special security event a great success. Each agency collaborated with the others to seamlessly integrate operations, quickly resolve problems as they arose, and smoothly accomplish the mission of supporting Super Bowl security. P

Randall Hamilton is a geospatial analyst in the North America and Homeland Security Division's Domestic Operations Branch.

Photo courtesy of John Hessler

New Deployables: Taking Shape and Already Working

By Al Trujillo

When NGA analysts deploy, whether to Afghanistan or Alabama, Baghdad or Baton Rouge, they take with them the same capabilities they use in their work area. These are systems that task, collect, process, exploit and disseminate geospatial intelligence (GEOINT) to meet their customer's mission.

A family of deployable systems now provides significantly improved capabilities through a collaboration between NGA's Acquisition Directorate and Office of Global Support (OGS). In earlier deployments, systems were not necessarily interoperable with those of their counterparts in the Department of Defense (DoD) and the Intelligence Community. With the emergence of the National System for Geospatial Intelligence (NSG) and a set of corresponding standards for configurations, specifications and data exchanges, interoperability became imperative.

The Deployables Program Office, composed of a government program manager and contractors supporting the Acquisition Directorate, worked with OGS to engineer a paradigm shift from unique, one-of-a-kind support systems to a family of systems that is NSG and DoD-compliant. National security events like the Super Bowl, disaster relief efforts and the global war on terrorism now have seamless, timely support from a family of systems that is scalable, modular and interoperable.

NGA Deployable Systems range in size from a super-equipped "civilian" emergency vehicle, the Domestic Mobile Integrated Geospatial Intelligence System (DMIGS), to large, medium and small transit cases. The variations in physical size primarily reflect the amount of data storage needed to support the given mission. All have a core set of GEOINT capabilities.

The DMIGS has traveled with teams of analysts, enabling NGA to significantly improve its support to national-security events and response to national disasters. At the same time, transit-case systems have enabled analysts to download current imagery and geospatial information to libraries as small as a lunch box. While a download takes place in the background, the analyst is free to exploit imagery or disseminate GEOINT.

Introduced last year (see the November-December 2006 Pathfinder, page 10), the DMIGS integrates GEOINT analysis hardware and software with a robust communication system. Analysts can send and receive data to and from NGA facilities while collaborating remotely to provide time-critical information on demand. DMIGS incorporates lessons learned in the development and operation of its military counterpart, the MIGS, which deployed during Hurricane Katrina. Yet it has a civilian look and feel.

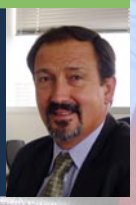
During the first deployment of the DMIGS for Tropical Storm Ernesto, which hit the East Coast last August, analysts successfully provided seamless support to federal and local officials. To enable the DMIGS to reach back for critical data to support its domestic hosts, the Enterprise Operations Directorate integrated a new point-of-presence at NGA for sending and receiving communication. The Deployables Program Office has since integrated the DMIGS "chase vehicle" with a "dismounted" incident-management capability, enabled by a handheld Global Positioning System receiver.

Soon NGA's deployables will have enhanced capability for ordering, preparing and exploiting imagery. The new Tactical Imagery Exploitation Segment will provide a simpler, less expensive tactical exploitation manager for NGA forward-deployed personnel. For warfighters, it will provide a simpler approach to identifying targets of interest and reporting their findings.

By developing deployable systems and integrating them into the NSG in record time, NGA has paved the way for future refinements. At the same time, NGA has provided our national, DoD and civil partners with an integrated set of tools to respond to any number of contingencies.

GEOINT is best absorbed into the mission space of our partners when tradecraft professionals are present to demonstrate its full potential. The Deployables effort provides the tools for the full effect of GEOINT to be realized at any location our customers need it. P

Al Trujillo
is the Deployables Program Office Program Manager.



3-D Modeling Adds a Dimension to Mapping

By Rodney Vanderpol

For security operations at last year's All-Star Base-ball Game in Pittsburgh, the FBI and Department of Homeland Security (DHS) relied on a three-dimensional (3-D) terrain model created from airborne laser data. The product is typical of hundreds NGA produces annually for national decision-makers, warfighters and the homeland security community.

Over 25 organizations use NGA models for operational planning and execution, as well as to augment high-level briefings for directors, senior managers and commanders. Physical 3-D scale models enable faster interpretation of complex information and facilitate face-to-face collaboration. They especially enhance comprehension for individuals unaccustomed to analyzing 3-D data or reading maps.

Highly accurate and realistic models of the Earth, equipment and facilities are produced by NGA's Geospatial Intelligence (GEOINT) Modeling Branch, which operates in two distinctly different modeling facilities. The 3-D Model Production Facility (3-DMPF) produces terrain models, and the Model Shop specializes in creating models of equipment and facilities.

NGA's extensive data sources and today's powerful computers enable the branch to produce models of unprecedented accuracy and quality and with unprecedented speed.

Terrain Modeling Employs High-Tech, Varied Data for Many Uses

NGA terrain models portray a richness of geospatial information that always captures the imagination of users, allowing them to better see the Earth as it is or to visualize the Earth as it has been or could be.

Their production draws upon NGA's expertise as a producer of interactive hydrographic, topographic and urban maps, and other GEOINT products. The ability of 3-DMPF staff to choose the right combination of geospatial products and combine them to create a single model speaks to the powerful collaborative effort that distinguishes branch activities.

Before producing a physical model, the staff creates a digital elevation model (DEM) to guide its computer-controlled milling machine. From blocks of dense polyurethane foam, the milling machine cuts DEMs of unprecedented precision. Then, image data is added to the DEM to enable computer-guided printing. A patent-pending ink-jet process prints a brilliant, full-color, high-resolution satellite image, aerial photo, or other graphic requested by the customer on the surface of the 3-D product.

Terrain models can be created in any size. Some fit on a tabletop, others are mounted to cover a wall, and a few are even tiled to fill an entire exhibition hall. Once the models are completed, the 3-DMPF staff crates the models for delivery to customers around the world.

The terrain model produced for the All-Star Game is a great example of how the combination of NGA geospatial products and the power of modeling can provide support before and during a major event. The use of airborne laser data allowed for a more detailed exploitation of buildings and terrain, including roads, utility lines, surrounding buildings, bridges and other venues in the area of interest than would otherwise have been possible. Beyond supporting the All-Star Game, the model continues to be used in the Allegheny County Emergency Operations Center as a disaster preparedness tool.

This year the U.S. Embassies in Jamaica and Barbados are using three NGA terrain models for operational planning in support of the Cricket World Cup. In another world event, the 3-DMPF produced multiple terrain models for the 2006 Winter Olympics in Torino, Italy.

Terrain models produced by 3-DMPF were used to understand the devastation caused by Hurricane Katrina. The staff produced multiple models of a 153-square mile area and shipped them to Baton Rouge, New Orleans and Federal Emergency Management Agency (FEMA) headquarters in Washington, D.C. The Coast Guard used the models in its rescue, recovery and reconstruction effort to visualize the magnitude of the destruction. FEMA continues to use the models for planning and reconstruction.

The Defense Advanced Research Projects Agency used three terrain models with a projection system to track vehicles it was testing in real time, as they traversed a 132-mile course through a mountainous desert region of Nevada. DARPA was studying the vehicles for their ability to protect military personnel driving on dangerous missions.

NGA's Office of Military Support provides terrain models to its warfighting customers for strategic and tactical

A computer-guided ink-jet process prints high-resolution, full-color airborne and satellite imagery on the surface of a three-dimensional digital elevation model in NGA's Geospatial Intelligence Modeling Branch.

training at home and in theater. Warfighters like being able gather around and touch a model as they discuss the geography, scale, distances and sight lines before they execute a mission. Using these models, warfighters can quickly grasp the operational advantage that may exist, given the nature of the terrain.

Model Shop Produces Everything Including Terrain-Style Models

Unlike the 3-DMPF, the Model Shop does not have a "product line." The Model Shop's approach is to listen to the customer's needs and then produce a highly detailed, customized product using a wide variety of materials and tools.

Customer requirements vary greatly; they might involve establishing a court case, identifying equipment capabilities, or studying a building to facilitate environmental or security planning or training.

Visitors who step into the Model Shop are likely to see a designer building a scale model of a facility using a milling machine and woodworking tools like drills, saws and lathes. Or they might see a designer building and customizing a kit model of a tank or a fighter jet. A technician is also likely to be at work using a computer-assisted design (CAD) tool to print a 3-D model of a weapon or space-launching system in a resin called acrylonitrile butadiene styrene, or ABS.

The Model Shop staff comes from diverse backgrounds, such as design, construction, imagery analysis, woodworking, mechanical engineering and computer systems. Shop personnel use a variety of source data, including imagery, photographs, CAD line drawings, cables, notes and artists' concepts. They work with data the customer provides or rely on their own research for the best source. Most models are made from plastic (ABS, Plexiglas® and high-density polyurethane foam), which is then sanded and airbrushed, but some are made out of metal.

In the past, models were always created by hand using traditional tools and hobby supplies. Today, models are built in stages using CAD, and computer-guided milling machines can render multiple copies of models in record time. Computer-guided 3-D printers lay down layer upon layer of melted and fused ABS resin to create very detailed models with inner stairways, moving parts, tire treads, levers and even hinged doors.

Prompt responses to political, economic or social unrest, natural disasters and manmade events require rapid, effective intelligence. NGA models have served requirements of the DHS, Department of Defense and Intelligence Community, international organizations and municipalities for situational awareness, strategic planning and operations. They can be sure that NGA's GEOINT Modeling Branch will continue to meet those challenges. P

Rodney Vanderpol
is the 3-D Model Production Facility Program Manager.

Safety of Antarctic Endeavors Depends on NGA

By Julia A. Collins

On average it is the coldest, driest and windiest continent. Ninety-eight percent of its land is covered by ice containing 70 percent of the world's fresh water. The rest is barren rock. An indigenous human population has never lived here. Winter temperatures average between 112 and 130 degrees below zero Fahrenheit, while summer brings a maximum temperature of 57 degrees and 24 hours of sunlight.

One by one the secrets of Antarctica are being revealed, as scientists study the effects of isolation under extreme conditions, the continent's interaction with the global climate system, changes in the extent of the ice shelf, and many more areas of interest.

Explorers have visited Antarctica for years, and today approximately 4,000 scientists from throughout the world conduct research and experiments during the austral summer months.

And each year, with new help from NGA, the U.S. military launches Operation Deep Freeze, or ODF, to provide supplies for U.S. Antarctic bases in the region.

Funded by the U.S. Antarctic Program of the National Science Foundation (NSF), the mission is a cohesive effort including members of the New York Air National Guard's 109th Airlift Wing, 62nd Airlift Wing, McChord Air Force Base, Wash., and U.S. Coast Guard. Currently, ODF is run from the George C. Kenney Headquarters of Pacific Air Forces in Hawaii.

Military pilots flying supplies into Antarctica face numerous obstacles, including whiteout conditions, hidden crevasses and winter winds that sweep through the valleys at up to 200 miles per hour. As a result, NGA's role includes a focus on safety of navigation and cross-directorate collaboration, said Air Force Lt. Col. John Bright, NGA's military liaison to ODF in the Analysis and Production Directorate's Office of Global Navigation (PV).

NGA has actively supported ODF for the last three-and-a-half years. The Agency's role grew from a request from the 109th Airlift Wing for updated aviation charts for Antarctica. The unit operates LC-130 Hercules supply flights delivering cargo to remote research locations from mid-October through mid-February. LC-130 aircraft can land on wheels or with specially equipped skis.

"The unit was very hungry for a lot of things, including updated charts," Bright said, "and our name was at the bottom of the charts, meaning NGA is responsible."

NGA analysts help Deep Freeze planners map a seasonal runway and provide updated navigation aids for the area.

Ice Runway

Each year in mid-October, large, C-17 Globemaster III planes from the 62nd Airlift Wing depart from Christchurch, New Zealand, with supplies for NSF researchers. Initially, the planes land on a temporary ice runway

located near the main U.S. research complex at McMurdo Station. Because the ice shelf is slowly moving, ice core samples are taken each year to determine the best location for the runway.

The ice runway is used from mid-October until December, when the runway becomes too slushy and flights are moved to two permanent airfields called Williams and Pegasus. At this same time, in mid-December, an icebreaker ship is able to clear a path, allowing a ship to deliver supplies and a tanker to bring in fuel.

Once supplies reach McMurdo Station, the smaller LC-130s are loaded and make the flight to NSF research stations located throughout the continent. One such station is located at the South Pole, where a new facility was recently completed.

"Every piece of building material was delivered via airlift," Bright said.

During the 2006-2007 season, according to a March 2007 Pacific Air Forces news release, "LC-130s flew 430 missions, moving nearly 11 million pounds of cargo and 1,000 passengers throughout Antarctica." The bigger C-17s flew 57 missions to McMurdo Station from Christchurch, carrying more than 3 million pounds of cargo and 2,700 passengers. Returning, the C-17s flew more than 720,000 pounds of cargo and 2,600 passengers to Christchurch.

All of these missions were flown with the help of updated navigation charts or aeronautical flight information provided by NGA.

Airfield Charts

NGA analysts became involved in ODF when they found that the military needed flight information products for airfields in the region. NGA publishes all Flight Information Publications, or FLIPs, for the Department of Defense (DoD).

Three permanent U.S. fields are located in Antarctica. Pegasus Field is a permanent ice runway where C-17 Globemaster III planes can land. Williams and South Pole fields are ski-ways requiring use of the LC-130 Hercules "skis" to land.

"We had to re-plot the runways," said NGA's lead production aeronautical analyst for the region. "They had moved 50 feet due to shifting ice and magnetic variation."

The FLIP for Antarctica is a loose-leaf product that is not a standard FLIP. NGA works with the Space and Naval Warfare Systems Command, or SPAWAR, to collect terminal procedures for the airfields. Raytheon Polar Services provides runway data for the procedures each year to SPAWAR. The flight procedures might look similar to those of past years, but they are not exactly the same. A heading or course, for example, might have changed from 244 to 246 degrees. Last year was the first year the Antarctic FLIP was published in a booklet. Previous productions were not to DoD specifications.

Overall, safety of navigation is the ultimate goal for the Antarctic FLIP. The 2007-2008 FLIP will include the

addition of elevation and terrain data, along with a table of contents, which was requested by ODF flight crews.

The Source Operations and Management Directorate's Global Foundation Office (SG) provides several products, including terrain elevation data. This information allowed PV to include contoured terrain features for the upcoming operation.

"I'm trying to provide them with a better product," explained PV's lead production aeronautical analyst. "It is a terrain-impacted environment."

For instance, Ross Island, where McMurdo Station is located, has an active volcano, Mount Erebus, and the continent itself is covered by a constantly moving ice sheet. "It's pretty hostile, and it's good to know they've got some good procedures," the lead analyst said.

Special Support Products

Members of NGA's support team have visited the 109th Airlift Wing at its home base in Scotia, N.Y., to gain a better understanding of the tools their military partners need.

One example of a unique mapping product PV produced was an Antarctic Landing Site Graphic, or ALSG. Because ODF takes place during the austral summer, daytime temperatures can reach into the 50s; however, ground temperatures are usually well below zero. This can result in a low cloud or fog deck between 200 and 300 feet above the ground, which presents an extreme visibility challenge.

Staff in SG's Geospatial Operations West used Canadian RADARSAT imagery to project glaciers, peaks and valleys for the ALSG. Currently, coverage is provided for the Wilson-Piedmont and Odell Glaciers, although the team plans to produce additional graphics for future missions. Landing site graphics give pilots a visual representation of the terrain.

"We had a short turnaround and had everything ready within eight weeks," said one of the cartographic analysts on the team.

The product was printed as a standard size, the same as a Joint Operations Graphic, which is familiar to pilots. It also folds up and can be placed in a flight suit for access, a small but important feature.

The team also produced an Antarctic Strip Chart showing routes from Christchurch to McMurdo Station. The chart contained corrected locations for the Balleny Islands, which were up to seven nautical miles off on previous charts.

These are just a few examples of the different products the team developed for its military partners. This year the group hopes to increase its tailored products from six or seven to at least 20 unique charts.

In addition to a partner-site visit with the 109th Airlift Wing, some members of the team attended a planning conference in May including members of the 109th, 62nd and NSF.

"It's important to meet and talk with customers," one of the analysts said. "They share lessons learned, and they plan for the next year."

The site visits and conference give NGA's military partners the opportunity to make specific, detailed requests. In addition, the team learns about the numerous areas of Antarctica where researchers with the NSF will be working.

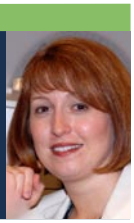
The team expects to be called on for additional products in the next few years when the military hopes to land C-17s at the South Pole. This will free the LC-130s to provide supplies to outlying, remote areas, increasing the need for accurate geospatial products from NGA.

The most important goal remains safety of navigation. "They will be called on to travel further out to dangerous locations, and we are planning for this," an analyst said. "We're providing specialized products for a non-traditional mission. These military flights are far removed from any other mission they conduct."

Antarctica "is the most dangerous place to fly," said a cartographic analyst.

When asked about the importance of NGA's assistance, another said, "It's a small effort on our part, but our impact is huge. With minimal expense, NGA is able to provide life-saving products." P

Julia A. Collins
is a Public Affairs Officer in the Office of Corporate Relations St. Louis Branch.



NGA and JFCOM Support Needs of Joint Warfighter

By Matt Reiner

The collaboration between NGA and the Joint Forces Command (JFCOM), otherwise known as the Joint Geospatial Activity (JGA), seeks to improve current geospatial intelligence (GEOINT) processes through reviews of doctrine, studies and assessments. Because of this, new initiatives, such as the development of the Joint Warfighter Interoperable GEOINT (JWIG) Concept of Operations (CONOPS), have emerged that provide a vision for how the joint warfighter will acquire, share and utilize GEOINT. In addition, changes are being looked at that require no additional funding while still enhancing GEOINT support to those serving in combat.

Located in Norfolk, Va., JFCOM is one of nine combatant commands in the Department of Defense and plays a key role in transforming the U.S. military's capabilities.

In an interview on his recent visit to NGA, JFCOM Deputy Commander Army Lt. Gen. John R. Wood spoke about the importance of the NGA-JFCOM partnership.

Could you describe the NGA-JFCOM partnership?

I think we have a strong partnership focused on the joint warfighter's needs. NGA has a great team down there of employees and leaders who work with us on a routine basis to support the joint warfighter.

How has this partnership helped JFCOM accomplish its mission?

JFCOM looks at training, force providing and experimentation. Therefore, a number of things important to us require a GEOINT backdrop. All of this allows NGA and JFCOM to produce the products the warfighter needs.

How do you foresee the warfighter using GEOINT products and services for future combat situations?

Well, we're always looking into that. For instance, we have the GEOINT test-bed activity at JFCOM. Being able to take those technologies and tools and apply them to the types of problems we have today and expect in the future gives us a good start on the kind of capabilities the joint warfighter is going to need, and, frankly, builds the training base to train our warfighters to use those technologies.

JFCOM Deputy Commander Army Lt. Gen. John R. Wood discusses a new JFCOM initiative at his office in Norfolk, VA. Wood is a major supporter of geospatial intelligence and working with NGA.

So there's an eye towards the future. There's an understanding of the present and an active teamwork that works these problems between Joint Forces Command and NGA.

Matt Reiner is a Strategic Communications Specialist in the Office of Corporate Relations, Strategic Communications Branch.

Working for NGA

‘Positive Attitude’ Valued by NORTHCOM NST Chief

By Juanita Hartbarger

Dale Hutchinson, Chief of the NGA Support Team (NST) assigned to the U.S. Northern Command (NORTHCOM), has been with NGA since before it was NGA.

“I’ve been in this business just under 30 years,” he said. “I started out as an Air Force imagery analyst way back in 1977 and joined the National Photographic Interpretation Center (NPIC) in 1987, and I’ve been with NPIC, the National Imagery and Mapping Agency and NGA ever since.”

NORTHCOM, one of 10 Combatant Commands (COCOMs), was created on Oct. 1, 2002, in response to the Sept. 11, 2001, attacks. Its mission is the protection of the U.S. homeland and the support of local, state and federal authorities. It is responsible for U.S. military operations in the continental United States, Mexico, Canada and the northern Caribbean.

Hutchinson became chief of the NORTHCOM NST in January of 2006, but this was not his first experience with an NST. Just before coming to NORTHCOM, he had spent nearly five years at the U.S. European Command (EUCOM) as NST Chief. This, combined with his previous military background, gave him a jump-start at NORTHCOM.

“My experience in the Air Force and my previous assignment in EUCOM helped me to easily transition into the NORTHCOM assignment,” he said. “I was able to hit the ground running. Understanding the military way of doing business is key to any COCOM position.”

NSTs, as the forward projection of geospatial intelligence (GEOINT), are invaluable throughout the Intelligence Community (IC). Hutchinson sees this as especially relevant in the COCOM environment.

“The COCOMs no longer have the expertise they once enjoyed in the imagery and geospatial disciplines and rely heavily on NGA to get them what they need,” he said. “Timelines often are not favorable to remote or virtual support.”

Being forward gives NGA representatives insight into the customer’s true needs, allowing them to prepare customized GEOINT. “Being on site provides an NGA ‘finger on the pulse’ and is in the spirit of true joint operations,” Hutchinson said.

NST Service Has Its Rewards

What about the value of NST service from the NGA analyst’s or staffer’s perspective? Hutchinson sees benefits as well as a potential downside.

“I’m always concerned about being away from the flagpole and being out of sight and mind,” he said. “We have to make sure we are in sync with our home offices. We help close the physical-separation gap by frequent telecons, VTCs (video teleconferences) and TDYs (temporary duty assignments).”

On the other hand, NGA analysts and staff officers who want to move into the senior IC ranks stand to benefit. In May of 2006, John Negroponte, former Director of National Intelligence, signed Intelligence Community Civilian Joint Duty Program Directive 601, creating the Joint Duty Assignment program. Under this directive, once implementation and operating guidelines are established, IC personnel who want to be considered for executive positions (positions above the Band 5 or GS 15 level) must have served at least one 12-month tour of duty outside their home organization.

Service at an NST is one way to start fulfilling that requirement.

What does it take to be effective at an NST? “I personally like to hire a positive attitude,” Hutchinson said. “Capabilities and skills are obviously important factors, but if a person does not come as a solid professional with a positive attitude, NST life can be very difficult. COCOMs are very demanding partners. Good interpersonal skills and the ability to operate independently are also plusses.”

Hutchinson strongly encourages anyone who gets the chance to consider a stint at an NST. “Serving on an NST has been one of the best experiences of my career,” he said. “As an NST member, you have to embody the entire NGA mission, which gives you great insight into our full spectrum of capabilities. Most important, being at the pointy end of the spear, one sees firsthand how NGA’s work directly impacts the warfighter—the work literally saves and protects lives, which is what it’s all about.” P

Juanita Hartbarger
is a Public Affairs Staff Officer in the Office of Corporate Relations, Strategic Communications Branch.

21st Century

NGA Supports Airborne Chemical Plume Sensor Team

By Joanna Davis and Paul Lewis

NGA's InnoVision Directorate has been helping to conduct definitive research on the application of imaging-spectrometry systems in responding to chemical disasters.

The directorate is represented on a team that has provided airborne reconnaissance and surveillance at more than 60 of the nation's biggest events and disaster sites. Sponsored by the Environmental Protection Agency, the team has responded to events like the Space Shuttle Columbia disaster, chemical plant explosions and hurricanes Katrina and Rita, as well as spectacles like the Rose Bowl and Tournament of Roses Parade.

The airplane uses multiple sensors to detect, track and identify chemical plumes in a commercially available system called airborne spectral photometric environmental collection technology, or ASPECT. A high spatial-resolution line-scanner produces images and chemical maps, and an infrared spectrometer provides detailed chemical information of any point in a plume. The ASPECT-equipped airplane is a component of the Department of Homeland Security's Rapidly Deployable Chemical Detection System (RDCDS).

The day before this year's Tournament of Roses Parade and Rose Bowl, the ASPECT aircraft landed at the municipal airport in Oxnard, Calif., about 50 miles away. The City of Pasadena had requested the RDCDS to provide detect-and-warn capabilities for chemical warfare agents or toxic industrial chemical vapors at both event sites. The airport served as the ASPECT operations base for a vigorous schedule before, during and after the events.

All of the event data was analyzed by an infrared spectroscopist on the team, as well as by other team members, including scientists, engineers and emergency-response personnel. Their conclusion: no indication of the presence of any toxic chemical materials at either the Rose Bowl or parade sites.

Detailed analysis of the hyperspectral, infrared data collected over the Rose Bowl facility and along the parade route did indicate the presence of a variety of common atmospheric pollutants, but these were quickly identified as typical constituents of "Southern California air."

Atmospheric pollutants are detected, identified and tracked by airborne imaging and spectrometry systems at national-security events like the Rose Bowl. NGA's InnoVision Directorate provides operational support and research assistance in testing such systems for the Department of Homeland Security.

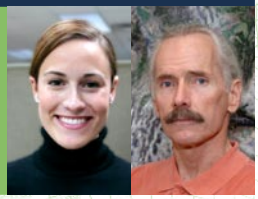
Later that day, it was estimated that there were more than 1 million attendees at the Tournament of Roses Parade and 90,000 at the Rose Bowl. The hazardous materials chief for the City of Pasadena stated, "This is exactly what we were looking for, and we expect ASPECT to participate in our 2008 Tournament of Roses Parade and Rose Bowl Game."

The ASPECT team, in collaboration with the InnoVision Directorate's Information Integration Office, has tested the sensor suite in actual disaster-response operations and controlled experiments, as well as national special security events, or NSSEs. In these tests, ASPECT has demonstrated reliability and utility critical to the needs of civil organizations chartered with the protection and safety of our citizens during mitigation of chemical disaster situations. P

Joanna Davis (Left) **and Paul Lewis** (Right)

Davis is a contract technical writer supporting the InnoVision Directorate communications team.

Lewis is involved in both research and operations as a member of the ASPECT chemical plume sensor team. He works in the InnoVision Directorate's Information Integration Office as an imagery scientist and project engineer.



Navy Yard's Wall of Fame Marks Arrival of GEOINT

By Dr. Gary E. Weir

Talented people willing to collaborate, trust and understand different perspectives on the same problem created modern geospatial intelligence (GEOINT). This remarkable tool has emerged as one of the most powerful intelligence products currently supporting our customers.

Only 11 years ago, imagery-analysis and geospatial-information services remained separate and distinct disciplines. Innovators had recommended strongly the integration of talents assembled in 1996 under the umbrella of the National Imagery and Mapping Agency (NIMA), now NGA. However, strong cultural identities on all sides made the idea of cartographers and other geospatial specialists working alongside imagery analysts very difficult.

Recognizing possibilities in a genuine partnership, a number of people stepped forward to bridge the gap. In one case, a senior cartographer who had worked for the Defense Mapping Agency (DMA), one of the predecessors of NIMA, found herself in a position to help. Working for NIMA at the Washington Navy Yard, home of most imagery analysts, she gained approval for a plan to blend the analytical skills applied to imagery with those of the geospatial arts and sciences. In 1999 she began to hire cartographers, geographers and other geospatial professionals for placement in some of NIMA's imagery-analysis offices.

As geospatial professionals began working alongside imagery analysts, all concerned began to appreciate more fully the cultural divide between the worlds of maps and imagery. Speaking with some old hands of the imagery effort, the DMA veteran received responses to her plan that ranged from "What am I going to do with one of them?" to "We would not recruit from that university." In an exchange with one imagery analyst, she asked, "Where do you get your requirements from?" To that point in time, cartographers lived by the routine of a production schedule working on discreet, well-defined projects, each with a neat beginning, middle and end. She learned that the imagery people just "knew what to do." In short, they owned their areas of specialty, their tasks, their analyses and the process of reporting. They thought out loud, collaborated regularly, and directed their own work to serve the mission at hand. "I was immediately jealous," the DMA veteran recalled. She wanted that same ownership, the freedom and responsibility it offered, and the same flexibility for people in her own field.

The bloody conflict in Chechnya presented the perfect opportunity for experimenting with tradecraft integration. Welcomed by a group willing to experiment, the DMA veteran asked a cartographer based in Bethesda, Md., to join the Eurasia group to merge his talent with their imagery analyses. The newcomer, who had worked for a private mapping firm, brought a sense for displaying information in a thematic context and weaving it into a story, similar to an imagery analyst's report. The imagery analysts quickly realized, firsthand, the critical contribution to a wartime mission that cartographers can make.

Once augmented by a geospatial professional, the Eurasia group proceeded to issue intelligence products that had their customers immediately clamoring for more. As one senior manager remembered it, Eurasia's new cartographer became "a rock star." He provided the magic ingredient that brought the effort and output to another level. Intellectual insight into a crisis expressed in a tight, complementary symphony of image and idea quickly set a new standard for professional achievement.

The chief of this pioneering group deliberately arrayed their early products on a display surface at the Navy Yard that quickly became known as the "Wall of Fame." He wanted the analysts who walked by to witness the emergence of something truly new and powerful. In a visit to NIMA during this period, CIA Director George J. Tenet lingered for a considerable time over the all-source intelligence on the Wall of Fame, as if the future of intelligence reporting lay before him. Within the next six months, 18 more geospatial specialists joined various imagery offices within NIMA.

The success of the Navy Yard Eurasia Branch eroded cultural barriers and promoted professional integration. NIMA's customers understood the crisis in Chechnya, as never before, through a lens we now call GEOINT. Intelligence had entered a new era. P

Dr. Gary E. Weir
is the NGA Historian.

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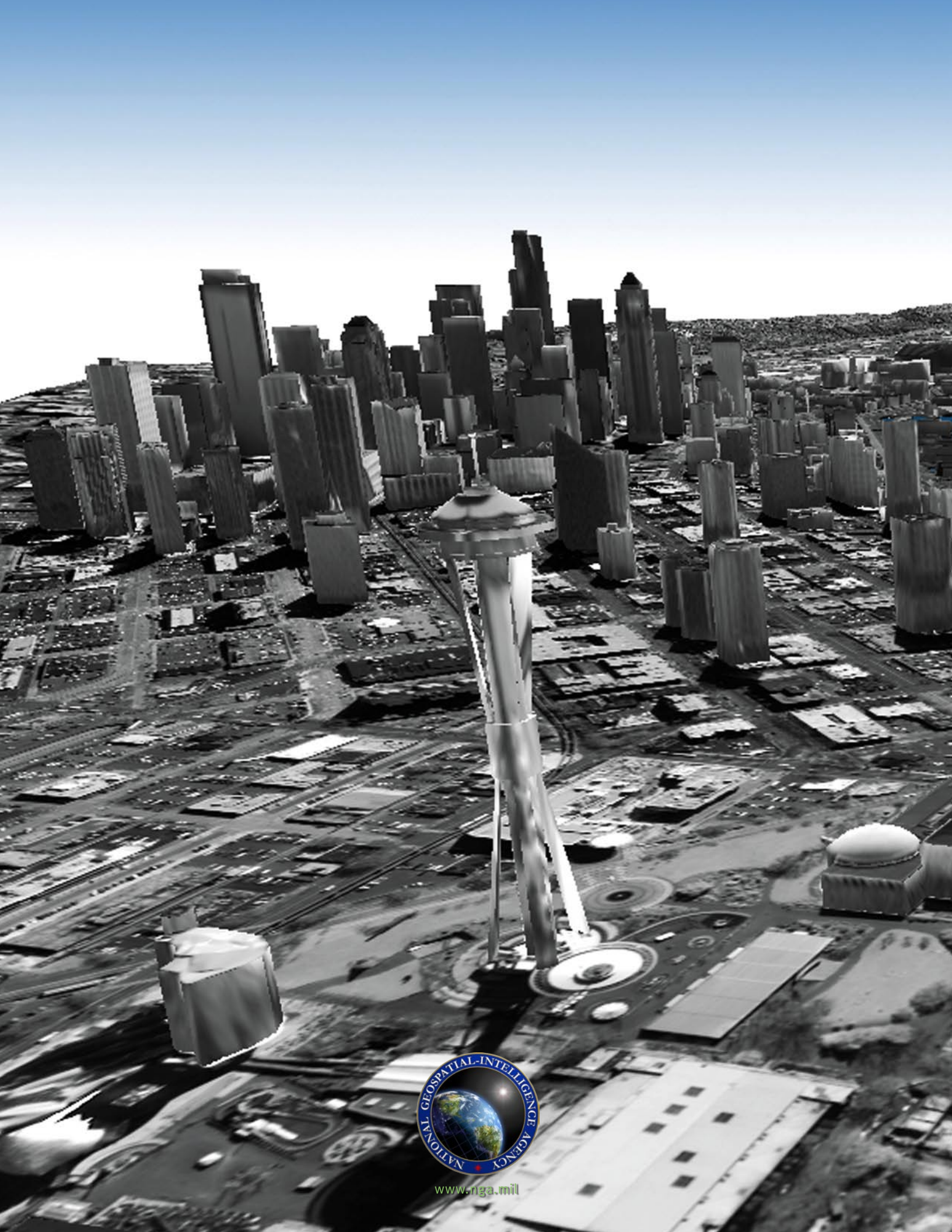
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